

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

CONSUMER PROTECTION & SAFETY DIVISION  
RAIL SAFETY ENGINEERING BRANCH

Resolution SX-49  
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**R E S O L U T I O N**

RESOLUTION SX-49 ORDER AUTHORIZING DEVIATION FROM GENERAL ORDER NO. 75-C, SECTION 7.8, ALLOWING THE UNION PACIFIC RAILROAD COMPANY AND OTHER RAILROADS TO RETAIN, UNDER CERTAIN CONDITIONS, THE USE OF 20-INCH BACKGROUNDS INSTALLED ON ITS RAILROAD CROSSING WARNING DEVICES CURRENTLY IN OPERATION.

**Summary**

The Union Pacific Railroad Company (UPRR) requests the California Public Utilities Commission (Commission) to authorize a deviation from General Order No. 75-C (G.O. 75-C), Section 7.8, requiring that backgrounds mounted on railroad crossing warning devices be 20 inches in diameter for 8 3/8-inch (8-inch) roundels and 24 inches in diameter for 12-inch roundels. The deviation would allow UPRR to retain the use of 20-inch in diameter backgrounds on its warning devices currently in operation. This Resolution authorizes UPRR the deviation from G.O. 75-C, Section 7.8, to retain the use of 20-inch backgrounds mounted on some of its railroad crossing warning devices currently in operation. The exemption applies to warning devices located at railroad crossings where the clearance envelop between the warning device and the roadway would have to be modified to accommodate a 24-inch background as specified in the Manual of Uniformed Traffic Control Devices (MUTCD). UPRR must notify the Commission of the crossing locations and the total number of existing warning devices qualifying for the exemption in order to be granted the exemption. As a result of comments received by other railroads, the exemption is extended to applicable warning devices of all railroads operating in California.

## Background

Pub. Util. Code § 768 grants the Commission the authority to prescribe the installation, use, maintenance, and operation of appropriate safety or other devices or appliances, and other protective devices at grade crossings. Pub. Util. Code § 1202 grants the Commission exclusive power to determine and prescribe the manner, terms of installation, operation, maintenance, use and protection of railroad crossings.

Rules governing the protection of crossings at grade of roads, highways and streets with railroads are codified in G.O. 75-C. Section 7.8 of G.O. 75-C states: “*Hoods and backgrounds*: Lamps shall be properly hooded. Hoods and backgrounds shall be black. Backgrounds shall be 20 inches in diameter for 8 3/8-inch roundels and 24 inches in diameter for 12-inch roundels.”

The MUTCD approved by the Federal Highway Administrator establishes the national standards for all traffic control devices installed on any street, highway, or bicycle trail open to the public. The American Railway Engineering and Maintenance of Way Association (AREMA) publishes a Signal Manual of recommended practices for the industry. The bases of these practices are founded on research, testing, and experience by professional engineers.

## Discussion

It has been UPRR’s practice to install 12-inch roundels on all its newly installed warning devices. UPRR has also replaced 8-inch roundels with 12-inch roundels on many of its existing warning devices operating throughout California. When converting to the more powerful signals on existing warning devices, UPRR did not increase the size of the backgrounds from 20 inches to 24 inches. The Commission’s rail safety inspectors have taken exception to UPRR’s practice of using 20-inch diameter backgrounds as a means to contrast 12-inch roundels on its automatic warning devices. It is UPRR’s position that the practice of pairing 20-inch backgrounds with 12-inch roundels is justified on existing equipment in operation and that the MUTCD and AREMA Signal Manual indicate that such a practice is acceptable.

To support its opinion, UPRR notes Figure 8D-1 of the MUTCD which illustrates a composite drawing of an active traffic control device. The drawing indicates

the option to install either a 20-inch or 24-inch background on a warning device. In addition, Section B.5a of Part 3.2.35 of the AREMA Signal Manual states “ A background having not less than 20-in. diameter shall be provided for the unit.” UPRR believes that the 20-inch minimum background applies to either an 8-inch or 12-inch roundel.

UPRR also notes that MUTCD has established criteria for selecting the size of the roundel that should be mounted on a railroad crossing warning device. Section 4D.15 of the MUTCD directs when an 8-inch or 12-inch roundel should be used. According to Section 4D.15, a 12-inch roundel should be used for approaches where the approach speeds exceed 40 mph, for approaches where a traffic control signal might be unexpected, for approaches without curbs or cutters, and locations where there is a significant percentage of elderly drivers. G.O. 75-C does not prescribe any similar safety guidelines for determining the size of the roundel that should be installed at a railroad crossing.

UPRR also argues that if it were required to provide a 24-inch minimum background for signal assemblies that were installed with a 20-inch background, it is possible that the edge of the larger 24-inch background would extend into the roadway clearance envelope. Such an extension would violate the clearance requirements defined in the MUTCD. The MUTCD requires that the lateral distance be at least 2 feet between the outer edge of the background to the curb, at crossings without curbs, the distance must be at least 6 feet. In order for UPRR to comply with the MUTCD standards, at crossings where the clearance requirement is at issue, warning devices with modified backgrounds would have to be moved to accommodate the clearance requirements. UPRR claims that the expense associated with moving the warning devices, which are embedded in concrete, would be substantial.

The Rail Crossing Engineering Section (RCES) agrees with UPRR that the MUTCD and AREMA Signal Manual appear to indicate that a 20-inch background paired with a 12-inch roundel is acceptable. Figure 8D-1 of the MUTCD, and Part 3.1.35 of the AREMA Signal Manual indicate the option to install either a 20-inch or 24-inch background on a railroad crossing warning device, but the size of the roundel that should be paired with a particular background is not clearly specified.

RCES recognizes that if UPRR were to apply the guidelines in Section 4D-15 of the MUTCD and install 12-inch roundels on its warning devices that have 20-inch backgrounds, UPRR would have to increase the size of the backgrounds

to 24 inches in diameter to comply with G.O. 75-C. Similar action would have to be taken on warning devices where 12-inch roundels are now paired with 20-inch backgrounds. In situations where the installation of the larger backgrounds would violate MUCTD clearance requirements, UPRR would be forced to move each warning device to achieve the proper clearance. Given that a considerable amount of UPRR's warning devices in operation are equipped with 20-inch backgrounds, such an undertaking could place a substantial burden on UPRR. However, in situations where there is sufficient clearance to accommodate a 24-inch background, UPRR must comply with G.O. 75-C, Section 7.8, by installing the larger backgrounds.

Although Section 7.8 of G.O. 75-C clearly states that backgrounds shall be 20 inches in diameter for 8-inch roundels and 24 inches in diameter for 12-inch roundels, UPRR has demonstrated that meeting this requirement, in some cases, may not be practical. For instance, if refitting the warning device with larger backgrounds would violate MUTCD clearance requirements so that the warning device itself would have to be relocated to comply with both the clearance requirements and the larger background requirements, the warning devices need not be refitted with the larger backgrounds as required under Section 7.8 of G.O. 75-C. However, at such time as the warning device is required to be reinstalled or relocated for other reasons, compliance with both the MUTCD clearance requirements and Section 7.8 of G.O. 75-C shall be required. Furthermore, UPRR warning devices installed (or reinstalled) after the effective date of this Resolution must adhere to G.O. 75-C, Section 7.8.

In order for UPRR to receive an exemption granted by this Resolution, it must notify RCES of the location of the crossing and the warning devices affected. A "Form-G" must be used as part of the notification process. In the "Nature of Change and Reference to Public Authority" section of Form-G, UPRR must state: "Request for exemption per Resolution SX-49" with an indication on the number of warning devices affected. In the "Date Effective" section of Form-G, UPRR must enter the date in which the 12-inch roundels were installed and the 20-inch backgrounds retained. No crossing or warning device can receive the exemption until a Form-G, requesting the exemption is submitted to, and verified by, the Commission.

### **Comments on Draft Resolution**

The draft resolution of RCES regarding this matter was mailed to the parties in accordance with Pub. Util. Code § 311(g)(1). UPRR, Burlington Northern and

Santa Fe Railway Company (BNSF) and the California Shortline Railroad Association (CSLRA) filed timely comments.

UPRR requested that the proposed variance be expanded to cover all of UPRR's existing active warning devices and that it should not be required to replace any of its 20-inch backgrounds regardless of whether a major design modification is needed to satisfy the clearance requirement of the MUTCD.

In its comments UPRR cited Resolution ET-1313, dated February 2, 1983, authorizing the modification of G.O. 75-C, Section 7.8 which permitted the installation of 24-inch backgrounds with 12-inch roundels. Resolution ET-1313 states: "It has been brought to the Commission's attention that the 20-inch diameter background size was originally intended for eight-inch roundels, and that their effectiveness as a dark contrast to the red lights may be mitigated when paired with 12-inch roundels. It was further suggested that the Commission allow the installation of 24-inch diameter backgrounds where 12-inch roundels are used to maintain the original four-inch border." UPRR notes that that when a 20-inch background is paired with a 12-inch roundel, the boarder width of the background is 4 inches.

It should also be noted that when a 20-inch background is paired with an 8-inch roundel, the width of the boarder to contrast the red light on the roundel is 6 inches. To effectively maintain the same contrast for a 12-inch roundel, a larger background is needed. A 24-inch background paired with a 12-inch roundel maintains the 6-inch parameter. When the Commission modified G.O. 75-C, Section 7.8, it intended to maintain a 6-inch parameter, as a means to provide a clear and effective contrast, between all backgrounds and roundels, which is evident in the current language of Section 7.8.

UPRR also commented that retrofitting warning devices with the 24-inch backgrounds would expose its signal maintainers to unnecessary risks and divert money and other resources away from other safety related purposes such as upgrading to the new light-emitting diodes (LED) lights. RCES is also concerned with the safety of the signal maintainers; however, UPRR did not provide enough information to substantiate its claim that replacing the backgrounds on warning devices would expose the signal maintainers to risks that would not normally occur during routine maintenance. On the issue of diverting funds and resources, UPRR could use the background modification as

an opportunity to perform routine maintenance and install upgrades such as the new LED lights.

BNSF also believes that Section 7.8 of G.O. 75-C should not be imposed on warning devices currently in operation. In its comments, BNSF emphasized that prior to the adoption of Resolution ET-1313 on February 2, 1983, Section 7.8 of G.O. 75-C allowed the pairing of 8-inch and 12-inch roundels with 20-inch backgrounds. Although such a design was acceptable at one time, as of February 2, 1983, Section 7.8 states, "Backgrounds shall be 20 inches in diameter for 8 ¾-inch roundels and 24 inches in diameter for 12-inch roundels". The Commission changed the requirement because of its concern that 20-inch backgrounds were intended for 8-inch roundels and weren't as effective in contrasting 12-inch roundels. RCES feels that the language of G.O. 75-C, Section 7.8 is clear and that the variance granted in this Resolution should not be extended to include all warning devices.

CSLRA also supports UPRR's request to retain the 20-inch backgrounds on existing warning devices. RCES elected not to respond to CSLRA comments because they were similar to those made by UPRR.

BNSF and CSLRA both feel that the variance requested by UPRR should apply to all railroads operating in California. RCES agrees with BNSF and CSLRA that all railroads operating in California should receive the same exemption that is granted to UPRR. If another railroad wishes to receive the same exemption at a particular crossing as UPRR, the railroad shall follow the same instructions, required by the Commission, and submit a Form-G notifying the Commission of each crossing that qualifies for the exemption under this Resolution.

## **Findings**

1. It has been UPRR's practice to install 12-inch roundels on all its newly installed railroad crossing warning devices.
2. UPRR has also replaced 8-inch roundels with 12-inch roundels on many of its warning devices throughout California. When converting to the more powerful signals, UPRR did not increase the size of the backgrounds from 20 inches to 24 inches.

3. The Commission's rail safety inspectors have taken exception to UPRR's practice of using 20-inch diameter backgrounds as a means to contrast 12-inch roundels on its automatic warning devices.
4. It is UPRR's position that the practice of pairing 20-inch backgrounds with 12-inch roundels is justified on existing equipment in operation and that the MUTCD and the AREMA Signal Manual indicate that such a practice is acceptable.
5. The MUTCD establishes criteria for selecting the size of the roundel. G.O. 75-C does not provide any similar guidelines for determining the proper size of the roundel to be used.
6. RCES agrees with UPRR that the MUTCD and AREMA Signal Manual appear to indicate that a 20-inch background paired with a 12-inch roundel is acceptable.
7. The expense for UPRR to modify existing warning devices to accommodate 24-inch backgrounds would be substantial.
8. The draft resolution of RCES regarding this matter was mailed to the parties in accordance with Pub. Util. Code § 311(g)(1).
9. Comments were received in a timely manner from UPRR, BNSF, and CSLRA.
10. BNSF and CSLRA requested that the variance granted to UPRR apply to all railroad operating in California.
11. Substantive changes were made to the Resolution as a result of the comments received by the parties.
12. The RCES staff of the Consumer Protection and Safety Division has reviewed UPRR's request and concurs with UPRR in granting a deviation of Section 7.8 of G.O. 75-C.

**Therefore, IT IS ORDERED that:**

1. The Union Pacific Railroad Company (UPRR) may retain the use of 20-inch backgrounds on its railroad crossing warning devices, currently in operation, at railroad crossings that would require a major design modification to meet the clearance requirement defined in the Manual of Uniform Traffic Control Devices (MUTCD) for warning devices with 24-inch backgrounds.
2. In situations where there is currently sufficient clearance as defined in the MUTCD to accommodate a 24-inch background, UPRR must comply with General Order (G.O.) 75-C, Section 7.8.

3. Railroad warning devices installed or reinstalled after the effective date of this Resolution must adhere to G.O. 75-C, Section 7.8.
4. To receive an exemption granted by this Resolution, UPRR must notify the Commission's Rail Crossing Engineer Section of the location of the crossing and the warning devices affected by means of a "Form-G" as instructed in this Resolution.
5. Other railroads operating in California wishing to receive a similar exemption at a crossing, shall follow the same instructions, i.e., those other railroads seeking the exemption shall submit a Form-G notifying the Commission of each crossing that qualifies for the exemption under this Resolution.

This Resolution is effective today.

I hereby certify that this Resolution be adopted by the Public Utilities Commission at its regular meeting on \_\_\_\_\_. The following Commissioners approved it.

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WESLEY M. FRANKLIN  
Executive Director